

## **REMARKS**

Favorable reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

### **I. CLAIM STATUS AND AMENDMENTS**

Claims 6-25 were pending in this application when last examined.

Claims 6-25 were examined on the merits and stand rejected.

Claim 6 is amended to recite a plurality of regions isolated from each other by compartment walls over each electrode located in the electrode pattern.

Claim 6 is further amended to recite wherein the compartment walls are discontinuous so that the nerve cells are capable of forming a cell network. Support for such amendment can be found on page 8, lines 14-18, page 7, lines 16-18, Fig. 2(b) and Fig. 7, of the specification as filed.

Further, Applicants note the specification is clearly drawn to neural networks which, by definition, require that the nerve cells are connected. Thus, the walls of the claimed invention must be discontinuous.

Claim 14 has been amended to delete the words "each other." Support for such amendment can be found on page 7, lines 18-20, of the specification as filed.

No new matter has been added.

### **II. INDEFINITENESS REJECTION**

In items 3 and 4, claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out whether each electrode in the pattern is isolated from one another or if the entire pattern is isolated within a cell culture chamber from other chambers containing equivalent electrode patterns. Applicants point out that claim 1 was previously cancelled. Applicants make the following arguments with the assumption that the Examiner intended to reject claim 6.

Applicants assert that claim 6 has been amended to clarify that the compartment walls form regions which isolate each electrode in the pattern from other electrodes.

Therefore, the amendment to claim 6 renders this rejection moot.

### III. OBVIOUSNESS REJECTION

In items 8-13, claims 6, 7, 9, 11, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klemic et al. (US 6,699,697 B2) (hereinafter Klemic et al.) in view of Yasuda et al. (US 7,092,154 B1) (hereinafter Yasuda et al.).

Applicants respectfully traverse this rejection.

Specifically, the Examiner contends that Klemic et al. discloses a planar patch clamp electrode that includes multiple electrodes or electrode patterns within a dish well where each electrode has its own well where the well holds one cell. Moreover, the Examiner asserts that Yasuda et al. discloses an apparatus for microscopic observation of long-term cultures that includes the cells being formed onto a substrate covered by an optically transparent membrane. Finally, the Examiner contends that it would have been obvious to one having ordinary skill in the art to combine the teachings of Yasuda et al. and Klemic et al. in order to retain cells within the wells of Klemic et al. to achieve the claimed invention.

Applicants contend that the claimed invention is not obvious over Klemic et al. in view of Yasuda et al. An object of the claimed invention is to provide a technological system capable of measuring a change in the stimulus response of a neural network while controlling the morphology of the neural network. In order to achieve such a system, an isolated nerve cell must be able to extend its neurites from its confining region to construct neural networks with surrounding nerve cells. The Applicants assert that they are the first to achieve this invention by forming regions confined by walls which are discontinuous, i.e. containing gaps, openings or spaces. See Figure 2b of the specification as filed. Such spaces are large enough to allow neurites to pass through while small enough to confine the nerve cell. Further, such discontinuous spaces are essential to the invention because as the confined nerve cell matures, neurites extend through the compartment walls at the discontinuous openings to form neural networks with surrounding nerve cells. See page 8, lines 14-17 and Figure 7, of the specification as filed.

Applicants assert that neither Klemic et al. nor Yasuda et al. disclose or suggest a cell confining region wherein the confining walls are discontinuous. Specifically, Klemic et al. discloses a well containing an aperture, which creates a seal with an adjoining cell membrane so that the cell membrane contacts an electronic chip. See Figure 2, column 6, lines 10-18. However, Klemic et al. does not teach or suggest a discontinuous wall for neural outgrowth or

neural network formation. Moreover, Yasuda discloses a well for culturing a cell and an optically transparent membrane, but also teaches that the hole and membrane completely entrap the cell. See column 2, lines 56-61.

Therefore, the inventions of the cited references do not teach or suggest an inventive feature of the claimed invention, i.e. discontinuous walls allowing neural network formation. In order to render the claimed invention obvious, the relied upon references must teach or suggest all limitations of the current invention. Since neither Klemic et al. nor Yasuda et al. teach or suggest the limitation of the discontinuous compartment walls capable of neural network formation, this rejection is untenable and must be withdrawn.

In items 14-16, claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Klemic et al. in view of Yasuda et al. in further view of Varalli et al. (US 2001/0041830 A1) (hereinafter Varalli et al.).

Applicants respectfully traverse this rejection.

As discussed above, Klemic et al. and Yasuda et al. do not teach or suggest compartment walls that are discontinuous. Varalli et al. discloses an optical transmission system but does not teach or suggest a microchamber with compartment walls that have openings to allow neurite outgrowth. See abstract. Absent a teaching or suggestion from the combined cited references that the walls are discontinuous, this rejection is moot and must be withdrawn.

In items 17-22, claim 6, 7, 9, 11, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klemic et al. in view of Hanni et al. (US 6,689,594) (hereinafter Hanni et al.).

Applicants respectfully traverse this rejection.

As noted above, Klemic et al. does not teach or suggest a discontinuous wall. Moreover, Hanni et al. discloses a transparent porous membrane and a chamber which is sealed, thus completely entrapping the confined cell. See column 4, lines 4-6. Absent a teaching or suggestion from the combined cited references that walls of a region are discontinuous, this rejection is untenable and must be withdrawn.

In items 23-25, claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugihara et al. (WO 99/34202) (hereinafter Sugihara et al.) in view of Klemic et al. and Hanni et al. and in further view of Varalli et al.

Applicants respectfully traverse this rejection.

As discussed above, Klemic et al., Hanni et al. and Varalli et al. all fail to teach or suggest an essential limitation of the claimed invention. Although Sugihara et al. discloses cell potential measuring electrodes, it clearly does not disclose discontinuous compartment walls, which allow neurite outgrowth. In fact, Sugihara et al. fails to disclose any compartment walls for confining a single nerve cell corresponding to a single electrode in an electrode pattern. See page 13, lines 29-32. Therefore, since the combined references cited by the Examiner do not teach or suggest a limitation of the claimed invention, this rejection is untenable and must be withdrawn.

In items 26-31, claims 8, 10, 15, 17, 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klemic et al. in view of Hanni et al. and in further view of Sugihara et al.

Applicants respectfully traverse this rejection.

For the reasons noted above, Klemic et al., Hanni et al. and Sugihara et al. all fail to teach or suggest the limitation of discontinuous compartment walls of the claimed invention. Therefore, this rejection is untenable and must be withdrawn.

**CONCLUSION**

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and early notice to that effect is hereby requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned attorney at the telephone number below.

Respectfully submitted,

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June 29, 2009